

Case Studies

The aims of the Case Studies module are

1. to broaden participants exposure to practical aspects of statistics;
2. to develop in participants a critical awareness of how statistical ideas and techniques are used in practice; and
3. to improve the participants' skill in formulating and delivering a presentation on a statistical topic.

Each student will study two cases, in randomly allocated groups of four. Your group will have 15 minutes to present the case, and then time will be allowed for questions and active discussion. At the end of the discussion there will be an opportunity to give feedback to the participants who made the presentation.

Finding the paper in the Oxford library system is part of the task.

Notes on Working as a Group

Each individual will bring a different set of skills and background knowledge to the group. You will therefore get the most out of the exercise if you work together to prepare the presentation. Make sure every meeting has a focus, and that each individual is given the chance to contribute their ideas and skills. You may find it useful at first to assign someone the role of chairman, in order to make sure that the discussion stays on track. Useful guidelines for working effectively in small groups can be found at www.deakin.edu.au/current-students/study-support/study-skills/handouts/groups.php.

If not being used for a committee meeting, you are welcome to use the meeting room at the top of the stairs in 2 SPR to conduct your group discussions. Alternatively, the RSL has some spaces appropriate for this task.

Notes on the Presentation

Every member of the group should contribute significantly (but not necessarily equally) to the presentation. You are *not* expected to analyse the data yourselves, and please do *not* discuss any theory - this should be a study of examples.

A good presentation will

- Clearly and efficiently communicate the context, aims, methods and findings of the reported analysis;

- Deliver a clear, fair and accurate critique of the reported analysis;
- Suggest alternative analyses or ideas for improvement if appropriate;
- Deal appropriately and constructively with questions and feedback from the audience.

Remember that the audience will not have seen the report to be discussed. One of the most common mistakes is that groups do not clearly introduce the problem or describe the context of the analysis. This makes the rest of the presentation almost impossible to follow.

You can make use of the computer projector but do prepare in advance, e.g. have the file to be displayed on your desktop, and log on to the computer before before the talk (it takes much longer to log-in the first time you use it!).

Notes on the Giving of Feedback

After observing a presentation and participating in the discussion, you will have the chance to give some feedback to the presenters. This feedback will be anonymous, and only the individual or group to whom the feedback is directed will receive the feedback.

Feedback is valuable as it helps people to assess their performance, and to improve. However, please keep in mind the following points:

- Feedback should be positive or constructive, but never negative.
- Feedback should not be personal - you are communicating your perception of the presentation, not making a value judgement about an individual.
- Give specific feedback, for example about behaviours that you observed or the way you were feeling.
- Make it clear what you think should or should not be changed. Don't just say "I felt that . . . could be improved," but say *how* you think it could be improved.

At the end of the session I will give each of the groups a short list of comments relating to what I see as the main points of the analysis. You might like to take a few minutes with your group to go through the feedback and reflect on your presentation.

Schedule

Week 1 Introductory meeting

Week 2 Bland, J.M. & Altman, D.G. (8/2/1986) Statistical methods for assessing agreement between two methods of clinical measurement. *The Lancet* 307–310.

[Julie, Dong, Mari, Yafei]

Cloud seeding and Agent Orange: Chapter 3 of Shafer & Ramsey (2002).

[Julia, Jonathan, Di, Qiao]

Week 3 Eppig, C., Fincher C.L. & Thornhill, R. (2010) Parasite Prevalence and the Worldwide Distribution of Cognitive Ability *Proceedings of the Royal Society B* Published online doi:10.1098/rspb.2010.0973.

[Anjali, Iris, Li, Kamal]

Ein-Dor, P. & Feldmesser, J. (1987) Attributes of the performance of central processing units: a relative performance prediction model. *Communications of the ACM* **30**, 308–317.

[Zheng, Sophia, Mutsa, Ashan]

Week 4 ‘Calibrating a Snow Gauge’, Chapter 8 of Nolan & Speed (2000) This is an exception: you will need to do some of the analyses suggested on pp 165–6.

[Katherine, Jinfei, Tejas, Xi]

Buonaccorsi, J.P. (1994) Measurement error models for Gypsy Moth studies. Chapter 4 of Lange *et al.* (1994).

[Andy, Ayon, Fei, Jason]

Week 5 Pirkle, J.L., Schwartz, J., Landis, R. & Harlan, W.R. (1985) The relationship between blood lead levels and blood pressure and its cardiovascular risk implications. *American Journal of Epidemiology* **121**, 246–258.

[Praga, Warren, Tanaya, Tadas]

Read about Simpson’s Paradox in the article *FALLACIES, STATISTICAL* in the *Encyclopedia of Statistical Sciences*. and present an account of it, as well as discuss

Bickel, P.J., Hammel, E.A & O’Connell, J.W. (1975) *Science* **187**, 398–404.

[Julia, Anjali, Ashan, Mari]

Week 6 Hansen, D. *et al* (1999) Severe periconceptional life events and the sex ratio in offspring: Follow up study based on five national registers. *British Medical Journal* **319**, 548–9. (The analysis in this paper is very brief, and you may want to repeat it yourselves.)

[Tejas, Dong, Iris, Kamal]

Kanazawa, S. (2007) Beautiful parents have more daughters: A further implication of the generalized Trivers-Willard hypothesis (gTWH) *Journal of Theoretical Biology* **244**, 133–140.

[Katherine, Jonathan, Yafei, Di]

Week 7 Redelmeier, D.A. & Tibshirani, R.J. (1997) Association between cellular-telephone calls and motor vehicle collisions. *New England Journal of Medicine* **336**, 453–458.

[Julie, Fei, Tadas, Zheng]

Components of variance in analytical chemistry. *Analyst* **112**, 679–686, **114**, 1489–1495, 1699–1702. [Warren, Sophia, Ayon, Xi]

Week 8 Markson, L., Woodhams, J. & Bond, J. (2010) Linking Serial Residential Burglary: comparing the utility of *modus operandi* behaviours, geographical proximity, and temporal proximity. *Journal of Investigative Psychology and Offender Profiling* **7(2)**, 91–107.

[Praga, Jinfei, Mutsa, Andy]

Linkosalo, T. *et al* (2008) The Time Series of Flowering and Leaf Bud Burst of Boreal Trees (1846–2005) Support the Direct Temperature Observations of Climatic Warming. *Agricultural and Forest Meteorology* **149(3–4)** 453–461.

[Jason, Tanaya, Li, Qiao]

Books containing interesting case studies:

Lange, N., Ryan, L., Billard, L., Brillinger, D., Conquest, L., and Greenhouse, J. (eds) (1994) *Case Studies in Biometry*. Wiley.

Morton, S.C. & Rolph, J.E. (eds) (2000) *Public Policy and Statistics. Case Studies from RAND*. Springer.

Nolan, D.A. & Speed, T. (2000) *Stat Labs: Mathematical Statistics Through Applications*. Springer.

Ramsey, F.L. & Schafer, D.W. (2002) *The Statistical Sleuth. A Course in Methods of Data Analysis*. Duxbury Press.